ABET Course Syllabi for IND E 494: Design in the Manufacturing Firm

1. Course number and name: IND E 494: Design in the Manufacturing Firm

2. Credits and contact hours: 4 credit hours, 4 contact hours per week.

3. Instructor’s Name: Christina Mastrangelo

4. Textbook: None, but the course uses publically available material for supplemental reading.

5. Specific Course Information:
   a. Description: Engineering design in manufacturing firms is presented. Topics include design methodology, concurrent engineering, and project management. Focus on the relationship between product design and manufacturing (design for production and assembly).
   b. Pre-requisites: IND E 337.
   c. This is a required course in the program.

6. Specific goals for the course: In this course, students will utilize a system engineering methodology and other supporting techniques to frame their senior design project. This culminates in a design project proposal for INDE 495.
   a. Specific outcomes: At the end of the course students will be able to do the following:
      i. Conduct a systems analysis.
      ii. Analyze an engineering-oriented ethical situation using an analysis framework and codes of ethics.
      iii. Communicate project work in oral and written forms.
      iv. Understand the project management process and supporting tools.
      v. Conduct a risk assessment that identifies both technical and external factors.
   b. Criteria 3 outcomes addressed by the course:
      a. An ability to apply knowledge of mathematics, science, and engineering.
      b. An ability to design and conduct experiments, as well as analyze and interpret data.
      c. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
      d. An ability to function on multi-disciplinary teams
      e. An ability to identify, formulate, and solve engineering problems.
      f. An understanding of professional and ethical responsibility
      g. An ability to communicate effectively
      h. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
      i. A recognition of the need for, and ability to engage in life-long learning.
      j. A knowledge of contemporary issues.
k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
l. An understanding of the integrated, inter-disciplinary nature of the discipline.

7. Brief list of topics covered:
   - Systems Analysis Method
   - Design Project Fair
   - Learning in Teams (Jim Borgford-Parnell)
   - Evaluating Alternatives
   - AHP
   - Engineering Ethics
   - Risk Management & Other Design Considerations
   - Intellectual Property Issues
   - Project Management Techniques